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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •

June 8, 1940

Tails for Torpedoes

See Page 362

A SCIENCE SERVICE PUBLICATION

Do You Know?

The 51,000,000 *outcastes* of India's Hindu world are now called the "scheduled castes."

Listing 11 kinds of milk, the Department of Agriculture reports that *reindeer milk* is richest.

The only insect known to invade and damage telephone equipment indoors is the *fire ant,* reported troublesome in Texas.

The Montgolfier brothers, noted pioneers in *balloon* flights, started as children to make toy balloons with paper and flour paste.

A tattooing specialist in England says some soldiers and sailors are having their *blood types* tattooed on them, in case of need for transfusion.

To improve the *grass* of Washington's city parks, government scientists will make tests of weed control, soil improvement, and other factors.

The five most commonly owned *public utilities* in the United States now are waterworks, sewage disposal plants, cemeteries, airports, and auditoriums.

A *"waterproof"* living room, in which even rug and books have been made resistant to water, is a feature of a current industrial art exhibit in New York.

Worcester Art Museum, Massachusetts, has acquired a fifteenth century Italian *helmet,* which was found in a moat at Padua and which has four holes pierced by bolts shot from crossbows.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PSYCHOLOGY—PHYSIOLOGY

What are the effects of morphine that occur before the patient is aware of it? p. 361.

RADIO

What part of the radio spectrum is reserved for FM? p. 365.

ZOOLOGY

What duties are performed by the dogs of the French army? p. 360.

Wide-base *tires,* with rims about 1½ inches wider than present automobile tires, are in prospect.

A University of California agriculturist has listed a variety of simple *burglar alarms* for protecting chicken coops and horse barns.

Spring *migrations* carry some 60 million waterfowl northward to breeding grounds in Alaska, Canada, and northern United States.

Hunting *whales* commercially south of the equator did not begin until after the middle of the eighteenth century.

For its citrus groves and other farming ventures, Palestine is now making locally 30% to 50% of the *insecticides* it needs.

A simplified way of measuring the tendency of *paper* to curl—important to paper manufacturers—has been devised by the National Bureau of Standards.

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PSYCHIATRY

"Eye Jerk" Permits Quick Diagnosis of Dementia Precox

Organic Reflex Test Also Shows Progress of Patient; First Physiological Means of Distinguishing Condition

DISCOVERY for the first time of an organic reflex test for the dreaded mental sickness, dementia precox or schizophrenia, was announced by Drs. Andras Angyal and Nathan Blackman, of Worcester, Mass., State Hospital, at the meeting of the American Psychiatric Association in Cincinnati.

The test is an "eye jerk" test, something like the knee jerk test for syphilitic brain and nervous system disease. It is made by washing out the patient's ear with water. Following the washing, one gets "eye jerks," technically termed nystagmus, Dr. Blackman explained. The rate or speed of the "eye jerks" gives the doctor a means of diagnosing the condition, because in patients with schizophrenia, the eye jerks are much slower than those he has found in normal persons.

The eye jerk test is not only useful for diagnosis but also helps to show whether or not the patient is improving or getting worse and what effect treatment is having.

More than this, it is the first marked physical difference ever discovered between schizophrenic patients and normal persons. For years doctors have tested the blood pressure, heart rate and breathing of these patients and examined the chemical composition of their blood and made other similar studies in largely unsuccessful efforts to find a physical change corresponding to the change in their mental condition from the normal.

The differences have been so slight as to appear barely significant. But the eye jerk test shows a real difference.

"Most important," said Dr. Blackman in explaining the test, "we are a step nearer to knowing what really goes wrong in the brain when a perfectly normal individual goes insane."

The patient's reaction to the eye jerk test is even more marked when certain drugs are given before the test. Carbon dioxide and alcohol increase the eye jerks in the patients, but slow them down in normal persons. The reason for this difference has not yet been determined. A suggested explanation is that in schizophrenia there may be a disturbed integration between the higher and lower brain functions.

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MEDICINE

Lame Children Walk Again After Vitamin Treatment

THE MIRACLE of making little children walk again when wasted, useless muscles had apparently doomed them to life in a wheel chair has been accomplished in five cases by treatment with vitamins E and B. Details of the cases are reported by Dr. Simon Stone, Manchester, N. H. (*Journal, American Medical Association,* June 1)

One of these children was an infantile paralysis victim. Wasted muscles and pain in both legs made it impossible for this nine-year-old girl to stand alone or to rise from a lying to a sitting position. After she was helped to her feet she could walk, but with unsteady painful gait. Vitamin B—all members of the group—banished the pain and enabled her to walk without support. But her muscles remained wasted. When vitamin E, in the form of wheat germ oil, was added to the vitamin B treatment, her muscles were restored to nearly normal usefulness within one month, her limp greatly improved, and no sign of muscle wasting could be detected.

The other four children, similarly or worse disabled because of muscle wasting due to conditions other than infantile paralysis, gained muscle strength following the vitamin treatment, lost the fatigue and muscle pain they had felt on slight exertion, the texture of their muscles changed, and their wasted muscles were replaced by normally contracting muscle tissue.

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Women are no more susceptible to *X-ray burns* than men, says a Los Angeles dentist—but women sometimes fail to remove cosmetics containing lead, mercury, or heavy mineral salts and these absorb the X-rays and permit the skin to burn more quickly.

DOUGHNUT LIGHTS

Any harbor, lake or river area can be turned into a seadrome with the aid of these radio controlled lights strung in landing lanes. The fluorescent lights are operated by batteries and are turned on and off by short wave shore stations.

MOST CANDID CAMERA

Swallowed by the patient, this new tool of medicine photographs the inside of the stomach, showing ulcers or cancers.

PHOTOGRAPHY-MEDICINE

Candid Camera Photographs Interior of Human Stomach

Painful Ulcers So Small as To Be Hidden in Fold Of Stomach Lining Shown in Black and White or Color

CANDID camera photography has achieved a new angle in revelation of intimate details about one's person.

Not merely has it invaded the boudoir, where feminine beauty sits sans make-up and in hair curlers, but it now "shoots" human insides to find the cause of gnawing pains after eating.

Ordinary candid camera photography may destroy a reputation for beauty or dignity, but medicine's newest style of candid photography is expected to save suffering and life itself.

A painful ulcer so small or so hidden behind a fold of the stomach's lining as to be invisible to the penetrating X-rays may be found and recorded on black and white or color film.

Cancer may be detected by this new candid camera photography before it can be seen on X-ray pictures and in time for effective life-saving treatment. Efforts to save stomach cancer victims now frequently fail because the malignant growth has usually reached the hopeless stage by the time it is diagnosed.

Polypi, another kind of growth which produce no shadow on X-ray pictures, are caught by the pin-hole eye of the new candid camera and appear on the developed film.

Stomach inflammation, believed a forerunner in some cases of ulcers and cancer, can now be photographed.

Equally important, the candid photographs may show a normal, healthy stomach even though the patient complains of pain or other symptoms. In such cases the patient may be relieved of worry and the physician, instead of following false clues, can search beyond the stomach to find the true cause, and perhaps cure of the symptoms.

Thank a sword swallower for the gastroscope, of which the new medical candid camera is a modernized, photographic version. Physicians give credit in their scientific papers to a professional sword swallower who was the guinea pig on which early experiments were done.

The gastroscope might be called a stomach periscope. It is a flexible tube two and one-half feet long but no bigger around than one's finger. At the end of the tube is a small light and inside are 46 hand-ground lenses which, with the flexibility of the tube, enable the physician to see any part of the stomach he wants to examine for inflammation, ulcers, cancer or other condition.

Beautifully Clear Shots

This instrument shows the physician what the inside of one's stomach looks like. The stomach camera, called the Gastro-Photor, takes pictures, beautifully clear ones, of the inside of the stomach. At any time afterwards the physician can examine these, show them to other physicians in consultations, or use them to demonstrate stomach disease to medical students.

The stomach camera is tubular, measuring seven-sixteenths of an inch in diameter and two inches in length. It is attached to a stomach tube five-sixteenths of an inch in diameter—the kind of stomach tube which physicians have been using for years to wash out poisons that may have been swallowed or to collect the contents of the stomach for diagnostic analysis.

When the gastroscope is used, the patient's throat is anesthetized, the instrument is passed down into the stomach and within a minute or two the doctor has made his examination.

The stomach camera is swallowed down, no anesthetic being necessary, the candid photographs are "shot," and within about 30 seconds the entire procedure is over. The films are developed later in the usual manner and prints made for the doctor.

The tiny camera that does this vital job of intimate candid photography is divided into two sections, a lower and an upper camera. Between them is an illuminating lamp producing a blue white light of about 20,000 candle power for 1/120th of a second. The lamp is automatically controlled and does not create dangerous heat. The camera itself operates on the principle of pin-hole optics, like the old-style cameras children used to have and has a universal focus. Each of the two cameras carries four films placed at 90 degree angles to each other, each film taking two pictures, so that 16 pictures, covering the entire circumfer-

ence of the interior of the stomach at two levels, are taken in a single automatic exposure of 1/120th of a second. Each of the 16 candid stomach pictures covers an area of the stomach as large as a man's hand.

Large numbers of candid camera "shots" of both normal and diseased stomachs will be shown to doctors at the meeting of the American Medical Association in New York City this month.

Science News Letter, June 8, 1940

GENERAL SCIENCE

Failure to Respect Individual Threat to All Civilization

Group of Scientists, Philosophers and Religious Leaders Plan Battle Against Totalitarian Thinking

UNITING in a cooperative effort to save democracy and intellectual freedom in the face of what they believe to be a serious threat from totalitarian thinking, a group of scientists, philosophers, and religious leaders met in New York to discuss plans for a national conference. The conference is to be held next fall and is an attempt to surmount the barriers of departmentalized thought which have so far hindered religious leaders and scientists from working in close harmony.

It is intended that the conference will be a permanent organization. Discussions will be arranged at various universities and colleges for the purpose of acquainting students with the philosophical and religious implications of scientific findings and also with the scientific approach to problems of philosophy, religion and ethics.

Civilization is threatened by the rise of totalitarian systems, the group meeting in New York declared. Science, philosophy, and religion face a common danger, for none of them can survive in an atmosphere of totalitarian thinking. They can survive, these men have decided, only in a world which respects the human worth of the individual.

Philosophy and religion contribute to the world of science a recognition of the dignity of the human individual and the rights of humanity, to live and to add to human knowledge. Science contributes a searching, experimental attitude that refuses to accept dogmas and limit experimentation.

All have a common stake in the democratic way of life.

Meeting in the group were Prof. Louis Finkelstein, of the Jewish Theological Seminary of America, Prof. Harold D. Lasswell, New York University, and Prof. Paul Weiss, Bryn Mawr College, representatives of a large group of scientists and religious leaders.

The purposes of the conference are explained in the following statement issued at the meeting.

"The founding members of the Conference on Science, Philosophy and Religion in Their Relation to the Democratic Way of Life realize that today civilization itself is threatened by the rise of totalitarian systems based on anti-scientific, anti-philosophic, and anti-religious dogmas; that Science, Philosophy, and Religion can survive only in a world which respects the human worth of the individual; and, at the same time, that each of these traditions can make a contribution to the concept of universal human worth. They believe, further, that the departmentalization of thought in democratic societies has been in part responsible for the weakness of democracy in the face of totalitarianism.

"Clearly the time has come when those who are helping to fashion an American way of life should try to meet one another, to reach a mutual understanding, and if possible to formulate the basis on which they may cooperate for the preservation of democratic ideals.

"There is no suggestion that any discipline should become subject to another; nor is there any thought of reducing the various religious traditions to a common denominator. But without surrendering its individuality, each tradition—philosophic, religious, or scientific—involved in the general purpose, could contribute to the creation of mutual respect and understanding and to a common approach to American democratic living."

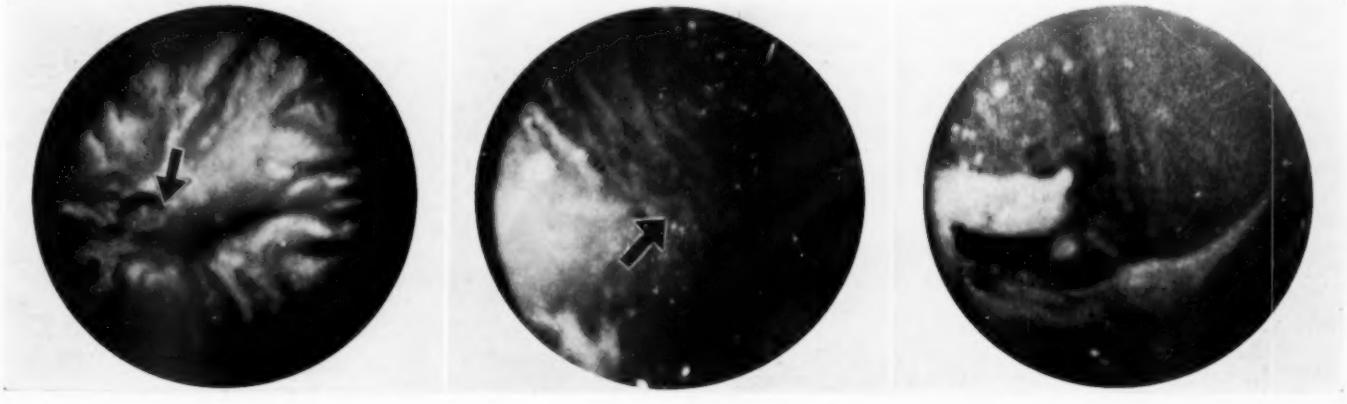
Science News Letter, June 8, 1940

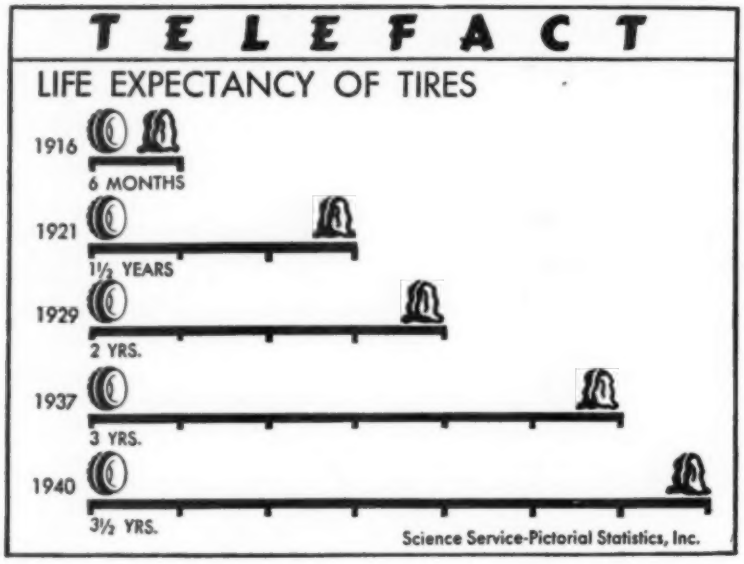
More than 150,000 *"Huns"* — Hungarian partridges—have been liberated in widely scattered regions of the United States.

The United States received no *synthetic camphor* imports in the first quarter of 1940—Germany was almost the sole source of that product.

WHAT THEY LOOK LIKE

These shots taken with the new stomach camera described on the facing page show (left) a stomach ulcer as it causes those gnawing pains; the ulcer healing (center) and a cancer of the stomach.





AERONAUTICS

Swift Action in Europe Shows Up Aviation Lacks

British Royal Air Force Hampered by Lack of "Pocket Battleships of Air"; Have Not Standardized Models

By LEONARD H. ENGEL

GERMANY'S Luftwaffe has profited in three weeks of western front Blitzkrieg from many Allied shortcomings other than the overwhelming one of appalling shortage of planes, study of the action so far indicates.

It is still too early to come to final conclusions about many things, but each day's budget of cables from the war zone seem to this correspondent, who is recently returned from Europe and who has followed aviation developments closely for some time, to be revealing these weaknesses.

The Royal Air Force today is paying for lack of multi-engined fighters—"pocket battleships of the air." These are heavily-armed speedy fighting planes developed in Germany, France and the United States in recent years. Examples are the Bell Airacuda, 350 miles an hour and two 37 mm. cannon and four machine guns; the 450-mile-an-hour Lockheed P-38; and, of course, Germany's efficient Messerschmitt 110.

The 360-mile-an-hour Me 110 has been doing yeoman work convoying bombers and attacking Allied fighters in its own right. Unfortunately for the Allies, France's fighter-bomber-reconnaissance monoplanes have not gotten far beyond the preliminary production stage as yet.

British single-seat fighters, the Supermarine Spitfire and the Hawker Hurricane, are the best single-seat fighters in the war. The American Curtiss P-36, beloved by French combat pilots, is also more than a match for its single-seat opposition, the Messerschmitt 109, a highly-modified version of which holds the current world speed record. But none of these Allied planes are in the same league with the faster, longer-ranged and more heavily armed Me 110.

Argument still rages among aeronautical engineers as to which type—single or multi-engine—should be faster. But none deny that the Me 110 is faster; and that any twin-engined fighter has more gun-power and greater endurance.

The British oversight is somewhat curious in view of the fact that the Westland Lynx, an English plane, was the first multi-engined fighter. Developed more than a decade ago, it was a failure and the whole class was apparently dropped. A speedy light bomber, the long-nosed Bristol Blenheim (six tons, 295 miles an hour) has been converted for use as a fighter, but it is a makeshift and is not fast enough.

The Allied air forces have been repeatedly criticized by airmen in touch with the situation for not developing ground attack techniques or dive-bombers adequately. This would appear to be something else coming home to roost.

England's sole plane in this class is the Fairey Battle, single Rolls Royce Merlin engine, 237-mile-an-hour top speed at low altitudes, inadequately armed. The Battle was sent to France at the start of the war, but was recalled from action in January of this year after it had proved to be "live bait" for bullet-spitting Nazis. The Nazi Ju 87 is more efficiently manned as well as being inherently superior.

People in aviation are also pointing out today that extreme British caution in placing aircraft orders, which resulted in perhaps four to six months' delay, is also "paying dividends." Had bulk orders been placed immediately on repeal of the embargo, instead of not before last month, deliveries might now be running at a 500-a-month rate in place of 250 a month. Deliveries are actually running a little ahead of schedule. The schedule appears to be at fault.

The multiplicity of British types has contributed to the Allies' numerical inferiority by making standardization more difficult and thus slowing production. Five British bombers are currently in production as against three in Germany, for example. One, the Vickers Wellington, is constructed on the fantastically complicated "geodetic" principle. It has 60,000 parts, 18,000 of them different—exclusive of skin or rivets. The plane is built in Southampton.

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Training of a *homing pigeon* in the army begins when the bird is four weeks old.

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenters:

Friday, May 24, 11:33.7 a.m. and 4:57.7 p.m., EST

Near Peruvian seacoast, north of Lima. Latitude 11.9 south. Longitude 77.4 west.

Tuesday, May 28, 8:57.6 p.m., EST

Headwaters of Porcupine River, south of Arctic Circle, about 50 miles east of Alaska-Canada boundary. Latitude 68 degrees north. Longitude 139 degrees west. Strong shock, in region usually rated as non-seismic.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see *SNL*, Feb. 24.

PLANT PHYSIOLOGY

One-Celled Green Plants Absorb CO_2 in the Dark

Accepted "Rules" of Photosynthesis in Plants Need Revision on Basis of This and Other New Experiments

ONE-CELLED green water plants have been proved to absorb carbon dioxide in the dark, in experiments reported, (*Science,* June 1) by Dr. H. Gaffron of the University of Chicago. This is contrary to the accepted "rules" of food formation or photosynthesis in plants, which calls for the use of light energy by the plants when carbon dioxide is absorbed.

This unorthodox behavior on the part of these lower plants takes place only in a special, artificial atmosphere containing hydrogen and oxygen. Some time ago, Dr. Gaffron reported the ability of the same plants to combine oxygen and hydrogen, presumably with the release of energy for their own use, in dim light. Now he has found that if a little carbon dioxide is added to the artificial atmosphere the process can go on in the dark, and that part of the carbon dioxide is absorbed by the plant as well.

"This means," comments Dr. Gaffron, "that all three types of carbon dioxide assimilation observed in living organisms, chemical reduction in the dark, photochemical reduction with hydrogen donors in the light and photosynthesis as specified by the liberation of oxygen, may occur in the same plant cell."

Another case of "unorthodox" use of carbon dioxide in the dark was recently reported at the Eighth American Scientific Congress in Washington, by Prof. S. O. Mast of the Johns Hopkins University. (See *SNL,* May 25) In Prof. Mast's experiments, a nongreen organism, so low in the evolutionary scale that it is not certain whether it is plant or animal, proved capable of thriving in the dark when supplied only with inorganic nutrient salts and carbon dioxide.

Discoveries of this kind are making necessary some rather marked revisions in physiologists' ideas regarding the processes of food formation and energy liberation by plants.

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MEDICINE

Alcohol Not Chief Cause Of Delirium Tremens

Pink Elephants Are Banished Despite Daily Quart of Whisky When Patient Is Given Large Doses of Vitamin B_1

ALCOHOL is "not the principal factor in the production of delirium tremens," three Providence, R. I., physicians, Dr. Hugh E. Kiene, Dr. Robert J. Streitwieser, and Dr. Himon Miller, seem to have proved. (*Journal, American Medical Association,* June 1)

Vitamin B_1 banished the pink elephants in short order, twice as fast as usual, even though the patients in their experiment continued to drink a quart of whisky daily.

These five patients were seeing every animal in the Barnum and Bailey outfit, according to one of them, when admitted to the hospital. They recovered, on the average, in 2.4 days on a treatment of large doses of vitamin B_1 plus a drink of four ounces of bonded rye whisky every three hours, day and night.

Another five patients admitted to the hospital in the same pink elephant stage following drinking debauches were given the same nursing care and same diet. But they did not get either the vitamin treatment or the whisky. It took an average of 4.2 days before these patients recovered.

Signs of kidney irritation in two of the patients disappeared within three days under the vitamin treatment even though the patients were continuing their daily quart of whisky. From which the physicians concluded that vitamin B_1 acted directly on the kidneys in a curative way.

The fact that recovery from acute symptoms of delirium tremens occurred practically twice as fast when vitamin B_1 was injected into the patients' veins, even in the presence of continuous drinking, indicates, the Providence physicians state, that the cause of the condition is primarily a deficiency of the vitamin in the presence of a deranged sugar-starch chemistry in the body.

Reason for the vitamin deficiency which brings on the pink elephants is the fact that the person who gets delirium tremens has a habit of failing to "stop for adequate dietary foods in his alcoholic meanderings after the first twelve hours."

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MILITARY SCIENCE

Research Facilities to Speed National Defense

HIGH-PRESSURE war work will soon displace much peaceful scientific research in American universities and the sooner the preparations are completed the better for this unavoidable, all-important job.

This seemed to be the judgment of the faculty of the California Institute of Technology which has placed its services at the disposal of the government to expedite the program of national defense.

It may be expected that similar measures will be reported from many university laboratories all over the country.

The trustees of the California Institute have approved the council on defense cooperation set up by the faculty to provide the most efficient means of mobilizing and coordinating effort. The council is to proceed immediately with a survey of the possible contributions which the Institute can make both through individual members of the staff and the special facilities in the laboratories. An executive committee of Prof. Richard C. Tolman, Dr. Max Mason and Prof. E. C. Watson were named. All were active in warfare service in 1918.

Many of the staff who are experts in fields of military significance have offered to devote a large portion of their time to the defense work. These are men who in the past have found nothing of sufficient importance to divert them from their own chosen research activities.

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AGRICULTURE

New Hybrid Cotton Better Than Pima

BETTER even than the famed Pima variety of cotton, is the claim made for a recently developed hybrid, as yet known only by the convenience-symbol "S x P," produced jointly by T. H. Kearney, R. H. Peebles and E. Gordon Smith of the U. S. Department of Agriculture.

In S x P cotton, East meets West, for the cryptic initials signify that it is a cross (whence the "x") between the Sakel variety of Egypt and Pima, originally evolved by Indian cultivators of the arid Southwest. It belongs to the long-staple class of cottons, especially desired for use in automobile tires, lisle hose, etc.

Among points of superiority claimed for S x P are yield, evenness of maturing, size of bolls, ease in ginning, lighter lint color and greater strength. The lint is not so long as that of Pima cotton, but it is more uniform in length. Sample spinnings of S x P yarns yielded a smoother, better-appearing product, the three government scientists state.

In total yield, S x P produced 5% more seed cotton per acre than Pima in the tests, but ginning increased the advantage markedly. Total lint per acre showed a differential of 13% in favor of the new variety.

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ZOOLOGY

Real Dogs of War Aid In Sentry and Patrol Duty

THERE are real "dogs of war." The French army has a dog service which is a definite part of the military forces. The Ontario Research Foundation, investigating Canada's resources for similar aid to British forces, tells of war work done by dogs.

Sentinel dogs mount guard with their masters at lonely posts and are invaluable owing to their acute hearing and sense of smell. They give warning by growling when someone approaches but are trained not to bark. Not only this but they are ready to attack an enemy if ordered to do so.

Liaison dogs perform much the same service as carrier pigeons, though the liaison dog can actually do better than the pigeon because he has been trained to obey two masters; to deliver a message and return with the reply. They can carry messages, both night and day, more rapidly than men on foot. The messages are enclosed in small cylinders attached to the collar.

Patrol dogs work on a long metal leash and accompany patrol parties. They go ahead and nose out the enemy, if he is in ambush. They are trained not to bark and will attack if necessary.

Watch dogs are used in munition depots, aviation fields and prison camps to keep unauthorized persons from entering the premises.

"Chiens de recherches" are dogs trained to follow the tracks of persons who are wanted, and are used in hunting out spies. These dogs must have good noses and the best of them will probably have bloodhound ancestry. Though these dogs will follow human tracks with accuracy, they are not the kind to attack fiercely and will have to be reinforced by other types of dogs and men runners.

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MEDICINE

Volunteers Immunized Against Influenza

HUMAN beings have been given protection against influenza by means of a vaccine prepared from the internal organs of ferrets sick with a combination of influenza and distemper, Drs. Frank L. Horsfall and Edwin H. Lennette of the Rockefeller Foundation have reported (*Science*, May 24).

Last March, Drs. Horsfall and Lennette announced the discovery of a double vaccine that would protect ferrets. It was partly the result of a chance natural infection of distemper, that invaded a group of ferrets which had already been inoculated with a strain of influenza virus for experimental purposes. When a vaccine was prepared from their bodies for the protection of other ferrets against distemper, it was discovered that the same vaccine also gave the ferrets protection against influenza.

Then small groups of human volunteers received doses of the vaccine, and subsequently were found to have an increase in antibodies against influenza.

It is emphasized that large-scale preparation of anti-influenza vaccine is somewhere in the future. Thus far, the only way that has been found to prepare the vaccine used in the experiments of Drs. Horsfall and Lennette has been by double infection of ferrets with influenza and distemper. Efforts to make it either on chick embryos in laboratory glass vessels or by inoculation of ferrets with the two diseases separately have not been successful.

Science News Letter, June 8, 1940

IN SCIENCE

MEDICINE—MILITARY SCIENCE

American Doctors Learn Defense Against Gas

INSTRUCTIONS on the physician's role in national defense against chemical warfare are given to American doctors (*Journal, American Medical Association*, June 1)

Details of "gas discipline," necessary in caring for victims of war gas and incendiary bombs, first aid requirements, and a warning that fear of poison gas is its greatest menace are given in a report by Dr. Leon Goldman and the late Dr. Glenn E. Cullen, of Cincinnati.

Science News Letter, June 8, 1940

PHYSIOLOGY

Rats Like Alcohol, But Not Very Much of It

RATS like alcohol, but not very much of it at a time, experiments at the Johns Hopkins Hospital indicate. The researches are reported (*Science*, May 24) by Dr. Curt P. Richter and Kathryne H. Campbell of the Henry Phipps Psychiatric Clinic.

Dr. Richter and Miss Campbell gave their laboratory rats two drinking bottles in each cage. At first both contained only water. Then alcohol in gradually increasing percentages was added to one of the bottles.

The animals showed a decided preference for the alcohol mixture in concentrations of from 1.8% to 4.4%. From there on up, their taste for "liquor" slumped sharply, and above 6% concentration they took very little of any of the alcohol mixtures, staying on the "water wagon" practically all the time.

In terms of beverages favored by humans, this would limit the rats' choice to beer or to twice-watered wine. Only one rat in a group of 17 was a complete teetotaler, always preferring water to even the weakest of the alcohol solutions.

Earlier experiments with rats in the same laboratory have produced evidence that the animals actually use the alcohol supplied in weak solutions to meet a part of their food requirements. Given alcohol, they left uneaten some food.

Science News Letter, June 8, 1940

NCE FIELDS

CHEMISTRY—MILITARY SCIENCE

Low Priced Noncombatant Gas Mask Perfected

SHOULD protection of American civilian life against gas become necessary, the Army's chemical warfare service, backed by a group of industrial plants, is ready with a new type of gas mask that can be produced in million-a-month lots at a cost of about $2 each. Educational orders have been placed with three manufacturing companies, and the Army's own gas mask plant at Edgewood, Md., has been enlarged to handle its share of the work.

The facepiece of the new mask is to be made of heavy gasproof cloth impregnated with synthetic rubber or gasproof plastics. In the canister will be absorbing blocks of activated wood charcoal made from Douglas fir wastes, replacing the scarcer and costlier coconut charcoal, to which it is also declared to be superior.

Science News Letter, June 8, 1940

AERONAUTICS

Ask U. S. to Build English Aircraft Engine

AS BRITISH troops battled in Flanders and Belgium with their backs against the wall to stop a Nazi drive which would secure the channel ports for an unprecedented invasion of the British Isles, the British Purchasing Commission presented to American aircraft manufacturers a plan to build in the United States a famous English aircraft engine.

The English would like American engine men to undertake manufacture of the 1,050-horsepower Rolls-Royce Merlin which powers swarms of British fighters.

Immediate reaction to the scheme was unfavorable, however, it was disclosed by key men in the industry which is now busy devising ways and means of meeting President Roosevelt's 50,000 planes-a-year schedule.

The Merlin is comparable to the American Allison engine, designed to fit new high-speed pursuits and fighters such as the Airocobra, the Lockheed P-38 and the Curtiss P-40. Both are 12-cylinder liquid-cooled motors in the same power class. It is the most important English aero engine.

Power plant of such famous Royal Air Force craft as the Hurricane and Spitfire fighters and the British mystery ship, the Boulton Paul Defiant, the Merlin is two years older than the Allison and is therefore considered that much better. It is commonly rated the finest "streamlined" in-line engine in the world.

Spokesmen for the American manufacturers declared that the Merlin could not be built economically or rapidly here because of lack of standardization with American equipment, for which our plants are geared, and because of several design peculiarities.

Science News Letter, June 8, 1940

PSYCHOLOGY—PHYSIOLOGY

Morphine Acts Before Effect Is Felt

MORPHINE dripping slowly into a vein in a patient's right arm can make his heart throb faster and his breathing slow — signals of important bodily changes—without his feeling any effect from the drug at all.

Helping to sort out the part played by the mind in drug addiction from the purely physiological part, three former morphine addicts and two post-graduate students who had never been addicted volunteered at the University of Kentucky to take part in a novel experiment. Results are reported by Dr. Ralph R. Brown. (*Journal* of *General Psychology*.)

Into the veins of these volunteers was poured a slow flow of a salt solution matched in strength to that natural in the body. At intervals something was added to this flow—a dose of morphine or more salt solution. The patient did not know which.

A continuous record was kept of pulse and breathing changes. The patient told of every change in feeling or bodily sensation.

Most interesting result was the speeding up of the pulse, which occurred before the patient was able to notice any effect from the drug. Morphine has been thought by physicians to slow the heart. Dr. Brown suggests that this depressing effect may possibly come not directly from the drug but as a result of the body's attempt to compensate for an exciting effect of the morphine. The speeding pulse was accompanied by slowed breathing.

Physiological changes were similar for the former addicts and the two non-addicts.

Science News Letter, June 8, 1940

MILITARY SCIENCE

"Chemical Warfare" Tried In Calais in Year 1410

CALAIS, recent scene of desperate fighting between Allies and Germans, was fought over long ago, when the English held it and the French were trying to get it back. In 1410, the Duke of Burgundy, according to Holinshed's Chronicle, prepared his own version of chemical *Schrecklichkeit:*

"For he had gathered together serpents, scorpions, todes, and other kinds of venemous things which he had closed and shut up in little barrels, that when the flesh or substance of those noisome creatures was rotten, and dissolved into filthie matter, he might laie siege to Calis, and cast the said barrels let out of engines into the town; which with the violence of the throw being dasht to peeces, might choke them that were within, poison the harnessed men touched therewith, and with their scattered venem infect all the streets, lanes and passages of the town."

The English, getting wind of the Duke's fragrant plans, did suborn a fifteenth-century fifth-columnist with much gold, to destroy the menacing munitions with fire. Their incendiary agent did so good a job that not only were the noisome little barrels burned up, but also all the Burgundian catapults and ballistas, and indeed the whole town where they were stored. So the English held Calais for a while longer (*Army and Navy Journal*, May 25).

Science News Letter, June 8, 1940

ENGINEERING

Sees Need Now for Tunnel Under English Channel

THE oft-proposed, but never begun, tunnel under the English Channel is discussed by the European correspondent of the *Army and Navy Journal* (May 11). His prediction is that construction of this underground route between Calais and Dover will be "the first great work undertaken after the present war."

If the tunnel existed now it would be possible to send 150 trains per day in each direction—transport two divisions of troops per day with all their materiel from England to France or from France to England.

As to the vulnerability of such a tunnel, the argument is that it would be safer than the Kiel canal, which has not suffered in the present war.

Science News Letter, June 8, 1940

MILITARY SCIENCE

Speeding Torpedo Production

Navy's Torpedo Factory at Alexandria, Va., Open Again for Business After Seventeen-Year Shutdown

By DR. FRANK THONE

See Front Cover

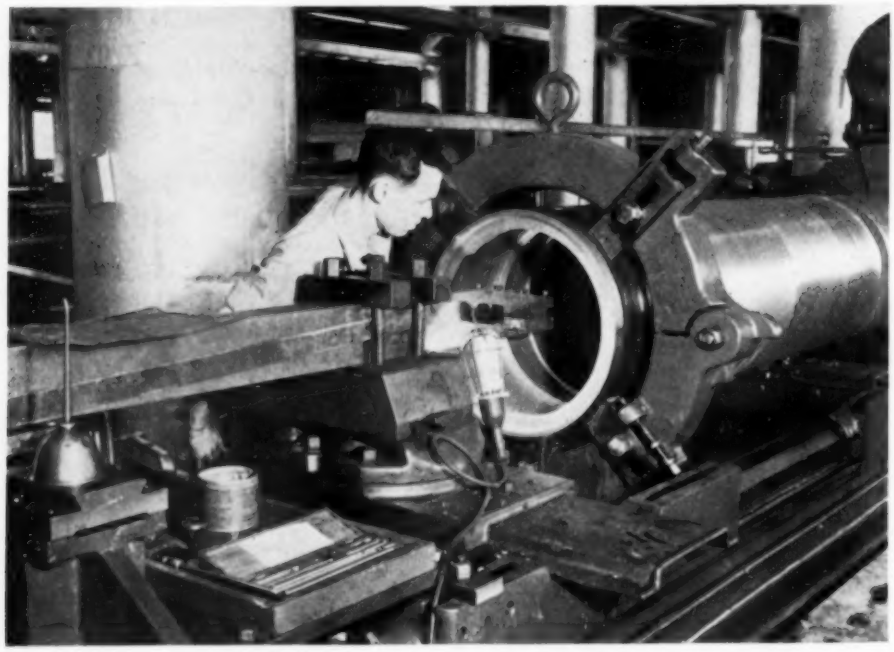
BUILDING a bigger navy means a lot more than simply riveting the ships together, putting sailors on them, and sending them to sea. A modern warship, whether light destroyer or ponderous battleship, is a mechanism of manifold intricacy, requiring munitions and supplies in a bewilderingly long list and mountainous in quantity to keep it functioning at full service efficiency.

So it comes to pass that while headlines hail the laying of keels of the world's biggest battleships for the U. S. Navy, and the launching of new destroyers and submarines in whole batches, there is a tremendous speeding up in these little noticed but vitally necessary services of supply behind the fleet.

Among other things, the Navy's capacity for manufacturing torpedoes is quietly being doubled. The Torpedo Station at Alexandria, Va., across the broad Potomac from Washington, has been opened after a 17-year shutdown. It is being re-equipped with the newest, most modern machinery and re-staffed with a force of skilled machinists and trained technicians. There are about 300 of them on the civilian payroll now, and when the station settles down to its full production stride their number will rise to some 750. Its capacity will become as great as that of the long-established torpedo station at Newport, R. I.

Why should the Navy need so many torpedoes? In normal times it doesn't. But the times are emphatically not normal. War roars to the east, mutters threateningly far to the west. We are building new ships for our protection in any possible emergency, re-commissioning over-age destroyers that have been laid up during the truce between the first and second World Wars.

Of surface torpedo craft, built and building, our Navy has well over 250. These destroyers carry from 8 to 12 torpedo tubes apiece. Of submarines, built and building, we have more than 100, each carrying from 4 to 6 tubes. Add to these the tubes carried by some of our cruisers and a few of our older battleships, and you have something between 2,500 and 3,000 tubes to be provided for —not counting torpedoes needed for those formidable new engines of war, the torpedo-carrying planes. Recall also that in addition to the torpedo it holds ready to discharge, every tube and every plane must have several others in the racks for immediate reloading, besides a stock in reserve at the fleet base. No wonder, then, that in the present state of world emergency the U. S. Navy has need for enough torpedoes to keep both its production plants steadily at work.



AT WORK ON AN AIR FLASK

Heaviest single part in a torpedo is the air flask, thick-walled to carry the charge of compressed air which serves instead of steam to drive the propelling turbines. These air flasks have to be finished smoothly, inside and out.

Efficient Machine Shop

Because a torpedo is a highly complicated set of mechanisms, its production calls for the most skilled, accurate and carefully planned kind of machine-shop work. That, in fact, is what the torpedo station at Alexandria really is: a huge, superbly organized machine shop. Its official designation is exactly and frankly that: it is known as Shop 70 of the U. S. Naval Gun Factory, and it is administered as a part of the Gun Factory whose main plant is across the river in Washington.

Shop 70 occupies a tract of 2.34 acres on the Alexandria waterfront, down among the warehouses and boat docks. Although its two buildings are large they are not conspicuous. They are not visible from Alexandria's main street, and you can reach the plant only by driving over the rough-pavemented, truck-frequented water-front street, criss-crossed with railroad tracks.

Shop 70, like the rest of the Navy Yard established in Washington, is very distinctly not in the tourist attraction class. Visitors are definitely not wanted, unless they have legitimate business there. Once you are properly identified, however, and your mission established as lawful and justified, you are treated with the utmost courtesy.

When I called at the plant (by previous appointment) I was met at the door by a Marine sentry, who ushered me up two flights of stairs to the office of the Officer-in-Charge, Comdr. R. W. Hayler, U.S.N. Busy though he was, Commander

Hayler dropped his work, called in Mr. J. L. Luber, his shop master, and the two men accompanied me on a complete tour of the plant, patiently answering all questions, showing staff photographer Fremont Davis where he could get the best camera shots, and not dismissing us until we had seen everything we had come to see. It was an experience that would probably be completely impossible in any other country in the world.

Nearest the commandant's office is the drafting room—for like any other modern mechanism, a torpedo is paper before it becomes steel. Here, under a flood of light from high windows, worked a couple of score draftsmen and designers, for further improvements toward a still more highly polished perfection are always being sought.

Then out into the shops. On this upper floor are produced the smaller, lighter parts with which the interior of a torpedo is packed. Row upon row of machines, small and medium lathes, drill presses, screw cutters, milling machines, each turning out piece after piece of steel, brass, light alloy, every piece a twin of its fellow to the thousandth of a hair's breadth.

Every machine has its individual electric motor drive; there isn't a line shaft or a foot of belting in the whole big plant. This helps to make it a very quiet shop, also a very well lighted one. There is no clangor, no sense of rush. Noise is wasted energy, as smoke is wasted fuel; energy is not wasted in Shop 70.

Still Installing Machines

New machines are still being installed. At one spot, a crew of Negro concrete workers were smoothing off the base for the installation of another lathe, while alongside them a machinist was watching the tool on his machine as it smoothly cut a thin curling ribbon off the surface of a short brass tube. Beyond were spaces where yet more machines will be placed.

Then downstairs to the ground floor, where the heavier lathes are installed, that turn out the three big pieces—cylindrical middle, tapering stern and rounded nose—that make up the outer shell of the torpedo. These are really big machines, almost as big as the great gun lathes in the gun factory proper, on the other side of the river.

They need to be, of course, for a modern torpedo is a pretty big affair, with a diameter of 21 inches and a length of more than 20 feet. These huge lathes true off the outside surfaces of the shell forgings, reach inside and thin them down to the requisite lightness.

Thus far, no finished torpedoes have been turned out by Shop 70. They are simply building up stocks of parts in the bins and racks, so that when the assembly line is started it may be kept well fed and running smoothly.

During its earlier operation, in immediate post-war days, the Torpedo Station was principally an assembly plant. Finished parts were procured elsewhere and put together here. The present plan, however, calls for complete self-containment. With the exception of a few simple, standardized stock parts, like rivets and screws, every piece of the complex mechanism that is a torpedo will be manufactured on the spot, even the gyroscope steering device and the delicately balanced depth adjuster.

Load Explosives Elsewhere

The loading of the high-explosive war heads will, of course be attended to elsewhere. The neighborhood is a bit too crowded to permit the handling of TNT in quarter-ton batches. With this exception, torpedoes will leave Shop 70 as finished products.

When a torpedo is finished at the Alexandria plant, it is wheeled out of the back door onto a wharf on the river. Here it is taken aboard a Navy service boat and carried downstream to the proving range at Piney Point, on the wide water about 90 miles down the Potomac.

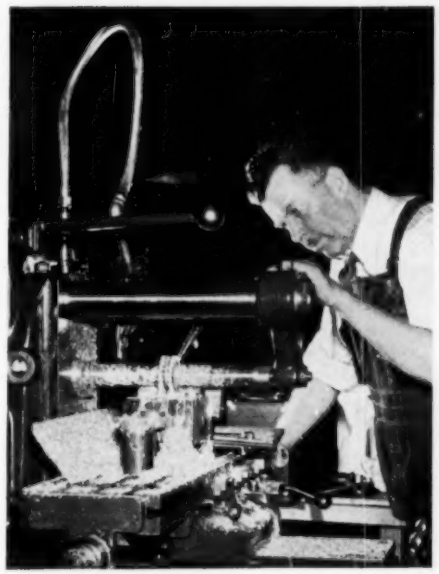
Here it is taken in hand by a picked crew of the Navy's best torpedomen and put through its paces. Fired from a tube mounted on a testing barge, it makes run after run under close observation, until the officers in charge are satisfied that it has the accuracy in both direction and depth that will insure proper performance if it is ever launched in actual combat. Then it is permitted to join the Fleet.

During test runs, of course, the torpedo does not carry its high-explosive war head, but a dummy or practice head filled with water. At the end of the run, an automatic mechanism blows the water out, so that the torpedo floats to the surface where it can be picked up and carried back for another run. Under war conditions, the torpedo is adjusted to sink instead of float if it misses its target, thereby removing it as a menace to navigation and also preventing it from falling into the hands of the enemy.

Shop 70 began its career as a war baby. Its construction was authorized by President Wilson in August, 1918. Even before the buildings were completed, in 1920, the shop force was at work producing parts, and the first complete torpedo was ready for testing in November, 1920.

After the Armistice there was of course less immediate need for torpedoes, and on June 15, 1923, the station was closed down. Shortly thereafter it was placed under its present jurisdiction as part of the Naval Gun Factory and latterly has been given the designation of Shop 70.

The torpedo, one of the most formidable of modern naval weapons and one of the most dreaded, has come a long way from its crude beginnings two-thirds of a century ago. It was first developed by Robert Whitehead, a Scottish engi-



SKILL AND MODERN MACHINERY

Newest lathes, milling machines, drill presses, each with its individual electric motor drive, fill up one floor of the Navy's torpedo plant. Some of the most highly skilled metal workers in the country are employed there.

PATON RANCH

Situated on a mountain stream in the foothills of the Big Horn Mountains. Here a limited number of guests are cordially welcomed.

It is a region of great geological and historical interest. Marine fossils, dinosaur bones and Indian implements are found nearby.

Guest cabins are comfortable and attractive. Food is good. The use of a saddle horse is included in the weekly rate.

Write for illustrated folder with map.

WILLIAM PATON

Shell Wyoming

IN THE STOCKROOM

Within a torpedo's fish-shaped shell is a bewildering assortment of small parts—some 1325 different shapes and sizes in all. Accumulating a sufficient number of these is the biggest part of the torpedo factory's work.

neer managing a factory at Fiume, then an Austrian naval base. He first applied the idea of making compressed air the propelling power, and his name still clings to the greatly improved and enlarged descendants of his brain-child.

Whitehead's first torpedo weighed 300 pounds, carried 18 pounds of dynamite, and reached a top speed of six miles an hour. Present-day torpedoes carry a 500-pound charge of TNT and develop speeds around 40 miles an hour, with an extreme range in excess of 8,000 yards.

There has been a steady increase in torpedo caliber. Early models, before the close of the nineteenth century, ranged around 14 inches in diameter. By World War days, 18-inch torpedoes were giving way to the 21-inch caliber now in general use in the world's principal navies. Until recently, the Germans held to a 19.7-inch caliber, but their newest torpedo craft have 21-inch tubes.

There is some hint of further increases. The French navy mounts a good many 21.7-inch tubes, and Britain's two big battleships, the Nelson and the Rodney, are listed as carrying two 24-inch tubes apiece. All other torpedoes used in the British navy, however, are 21-inch, like our own.

It will require very good and urgent reasons, however, for the U. S. Navy to abandon the 21-inch torpedo for another caliber. On the score of manufacture alone, it would mean a terriffic amount of trouble to change. There are about 1325 parts in a torpedo, and practically every one of them would have to be redesigned if a new caliber were adopted. It is better to stick to one good, efficient model as long as we can, the more so since we have such a heavy commitment in existing torpedo armament in that caliber.

A pronounced contrast to the uniform and standardized torpedo armament of the American navy is provided by the French. They have to provide torpedoes to fit tubes of the following calibers (in inches): 15.7, 18, 19.7, 21 and 21.7. Obviously, quantity production, on an assembly-line basis, must be seriously interfered with.

There has been a decided tendency, in the U. S. Navy, to abandon the mounting of torpedo tubes on battleships and cruisers. Our older capital ships and cruisers mount at least a few tubes, but not our later ones. Whether we shall continue thus to omit them from our larger vessels will probably depend, in part, on the lessons of the present war.

Torpedoes played a considerable role in the cruiser action off the mouth of the Plate river last December, even though no hits were scored, and all reports of the tangled fighting in the first days of Germany's invasion of Scandinavian countries indicate that torpedoes were freely used then. It may well be that the tubes will be given back to light cruisers, at least.

Science News Letter, June 8, 1940

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MILITARY SCIENCE

Super-Tanks, if Used in U. S., Must Cross Railroad Bridges

SUPER-TANKS of 70 to 90 tons or more, such as have taken part in the fighting during the past several weeks, would probably have to cross railroad bridges if used in this country. Very few of our highway bridges could carry such heavy and concentrated loads, and even all but the most massively built railroad bridges might find them something of a problem.

A fully loaded modern freight car weighs about 74 tons—50 tons for the load and 24 tons for the car itself. That puts on railroad bridges a load of the same order of magnitude as a super-tank, although even at that the tank's considerably lesser length would concentrate the weight to a dangerously high point. Yet in spite of all difficulties, American railroad bridges, built for much heavier rolling stock than is used in Europe, would be most nearly able to bear super-tank loads.

Highway engineers figure 22 tons as the maximum permissible truck-length load for even the strongest of our ordinary highway bridges. Heaviest tanks now in use in the U. S. Army, 18 to 20

tons, are safely within that figure. But try to put a load three or four times that great across anything but a monumental-type bridge, and your engineer would without further ado order up repair and replacement parts, and ask you how soon you thought you could pry your wrecked super-tank out of his wrecked bridge.

It is probable that the Germans reinforced with supporting cribwork even the stoutly built French stone bridges which severely censured Gen. Corap failed to blow up in time. It is significant that the Germans did need the bridges for their tanks—super-tanks evidently can't plunge down one bank of a stream, ford it, and climb the other bank as the more agile light and medium tanks can.

American military tacticians stress this country's needs for large numbers of these lighter and medium tanks, as well as the very fast armored scout cars, rather than the very powerful but ponderous and slow super-tanks. The latter, it is pointed out, are built for one special job, the breaching of an enemy fortified line. The lighter, faster vehicles are essentially weapons for warfare of movement, such as followed the initial German success in crushing through the "soft end" of the Maginot line northwest of Sedan.

Science News Letter, June 8, 1940

RADIO

Frequency Modulation May Cause Fast Changes in Radio

When FCC Cleared Radio Spectrum from 42,000 to 50,000 Kilocycles for FM, It Was Go-Ahead Signal

WITH frequency modulation radio, known as FM, given the green light by the Federal Communications Commission, the stage is set for rapid changes in radio—provided war does not freeze the present art and prevent progress.

Within the next five years, radio engineers are freely predicting, almost every large broadcasting station now operating will be paralleled by an FM station, probably carrying the same program. There will be many local stations serving limited areas that will operate on FM alone.

Within a few months or a year all the larger radio sets will be built to receive both the more ordinary amplitude modulation signals and FM. FM broadcasts can not be received on conventional radio sets. Thousands and perhaps millions of sets in the next few years will be manufactured and purchased, as FM broadcasting grows.

Elimination of static, extraordinary fidelity of tone, and lack of interference from distant stations are features of FM.

When the FCC cleared the radio spectrum from 42,000 to 50,000 kilocycles for FM it was a triumph for a kind of radio that many said could not be produced, the invention of Maj. Edwin H. Armstrong of Columbia University, father of important radio circuits used in almost all ordinary radio sets in use today.

Dominant radio broadcasting interests did not take kindly to a new kind of radio, although there was much more interest on the part of manufacturers of radio sets who saw a chance to fill a demand for more sets.

Radio typewriters, in homes and business offices, pounding out news in the same way that it comes over teletypes in newspaper offices, may be a by-product of FM. Or a facsimile service can be broadcast. Either of these services can be multiplexed or carried on the same wave band as the sound FM without any interference. Whether they will be available will depend upon whether the public wants these services sufficiently to pay the price of the rather costly and complicated receivers.

FM quality will be only as good as the receiver that catches the radio signal and converts it into sound. While much conventional radio broadcasting does not run the whole gamut of the spread of sound frequencies, most receivers are much more woefully deficient in their frequency ranges. For instance, the broadcast frequencies of transmitters often range from 60 to 10,000 cycles per second, while many receivers range only from 150 to 5000.

Science News Letter, June 8, 1940

An *armadillo's* armor, at birth, is soft and as flexible as leather.

● RADIO

Dr. Nathan B. Van Etten, president-elect of the American Medical Association will discuss developments in the field of medicine, as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, June 13, 4:15 p.m., EDST, 3:15 EST, 2:15 CST, 1:15 MST, 12:15 PST.

Listen in on your local station. Listen in each Thursday.

PUBLIC HEALTH

Malaria Mosquito Invasion From South America Feared

INVASION of the United States by a dangerous malaria-carrying mosquito, Anopheles darlingi, is feared as a result of the discovery of this South American disease vector as close to our border as British Honduras.

This mosquito is the most dangerous carrier of malaria in Brazil, except the gambiae mosquito recently imported from Africa. W. H. W. Komp, U. S. Public Health Service senior sanitary engineer stationed at Ancon in the Canal Zone, points out in his report (*Science,* May 31) of the northward trek of this mosquito.

Science News Letter, June 8, 1940

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in Science, growing improved vegetables, giant flowers in home or garden

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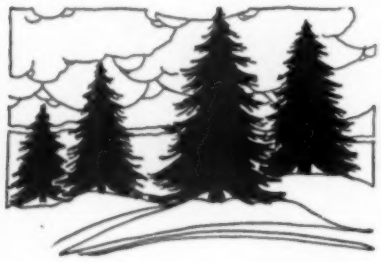
METEOROLOGY

NATURE RAMBLINGS by Frank Thone



Snow Surveys

SUMMER has come to the lowlands, but high in the western mountain country snow still lies deep on the slopes and in the ravines. Very important that snow is, too, for on its melting depend summer water supplies for irrigation, power, and the myriad-throated thirsts of cities.

Accurate surveys of total available snow water for any given district are made every spring by field workers of many federal, state, municipal and private agencies, and coordinated by the U. S. Soil Conservation Service. Rarely are their estimates more than 10% in error, and they have been able to hit within 1% of the mark on several occasions.

One or two of their records are really impressive. After detailed examination of the snow packed on the watershed of Klamath Lake, Oregon, the snow surveyors estimated that 875,000 acre feet of water would flow into the lake between October, 1938, and October, 1939. The actual inflow was 873,000 acre feet, within two tenths of one per cent of the amount predicted. Far to the south, other workers forecast the height of water that would be reached in Lake Mead, behind Boulder Dam, to within half an inch.

Forecasts are made on the basis of hundreds of snow samples, taken by plunging long metal tubes into snow masses. Since packing as well as depth is of importance, these samples are weighed, to get the actual quantities of water they would yield. Long experience has brought the method to a high pitch of accuracy.

Science News Letter, June 8, 1940

ENGINEERING

High-Octane Gasoline Is No Cure-All for Motor Ills

Engines Must Be Tuned Up, Too, and High Octane Advantages Are Reduced When Anti-Freeze is Used

GASOLINE of high octane rating, the advantages of which have been widely advertised, is no cure-all for the ills of motor car performance, members of the Division of Refining of the American Petroleum Institute meeting were told by C. H. Van Hartesveldt and H. W. Field, of the Atlantic Refining Co.

"When high-octane-number gasoline is used in a car which does not knock on the lower-octane material, no improvement in performance results," they stated, "and when a car that knocks is fueled with a high-octane gasoline, the knock is reduced, but no additional power or gasoline mileage is obtained unless the knock was extremely loud. Knock must be so loud for power loss that no motorist with normal hearing, driving such a car, would fail to take the car to a repair shop. These things have been known for some time, but they deserve more emphasis than they are getting in present-day advertising."

Messrs. Hartesveldt and Field urged that gasoline quality be measured by performance in cars rather than laboratory tests, which means that technical difficulties make it impossible to expect the success of recent legislative efforts to fix gasoline quality. They declared that "an increased cost of $5 a year for a motor vehicle, if used to pay for mechanical adjustments and tune-up of the engine, would result in greater owner satisfaction than this same amount of money spent in furnishing a higher-octane gasoline."

Science News Letter, June 8, 1940

Anti-Freeze Vs. Gasoline

ANY advantages in reducing engine knock obtained with high-octane gasolines is appreciably reduced when anti-freeze is used, Herschel G. Smith, of the Gulf Oil Corp., told the meeting.

"Water," he said, "is a more effective coolant, due to better heat transfer from the cylinder walls, than any known anti-freeze compound." He suggested that, with engines equipped with thermostatic control on the cooling system, for best performance a setting should be made for control at a lower temperature when anti-freeze is used than with water alone.

Science News Letter, June 8, 1940

Odor No Index to Quality

THE odor of gasoline gives no clue either to its performance or to its corrosiveness, said John Happel and S. P. Cauley, of the Socony-Vacuum Oil Co. For this reason they urged the elimination of tests now made for foul-smelling compounds called mercaptans.

"The average gasoline consumer of today is much more conscious of factors governing gasoline performance than of the more superficial specifications which were considered significant in the past," they said. "He recognizes the importance of such items as mileage, freedom from knocking, satisfactory starting, and warmup.

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Additional Reviews On Page 368

AERONAUTICS—ENGINEERING

EXPERIMENTAL AERODYNAMICS—Henry Christensen Pavian — *Pitman,* 168 p., $2.50. This book is the first simple and concise presentation of the elements of wind tunnel work in engineering applications. It is written from the standpoint of the student and young engineer.

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ELECTRICAL ENGINEERING

INTERIOR ELECTRIC WIRING AND ESTIMATING—Albert Uhl, Arthur L. Nelson and Carl H. Dunlap—*American Technical Soc.,* 342 p., $2.50. For the practical electrician is this book giving the details of electrical wiring in the home and factory.

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ENGINEERING

HEATING, VENTILATING, AIR CONDITIONING GUIDE, 1940, (Vol. 18)— *American Society of Heating and Ventilating Engineers,* 1184 p., $5. Here is the "Bible" of the engineers who install air conditioning systems and work with heating and ventilating problems. It contains a vast amount of data essential for anyone working in these fields.

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GENERAL SCIENCE

PAPERS OF THE MICHIGAN ACADEMY OF SCIENCE, ARTS AND LETTERS, Vol. XXV (1939) in Four Parts—Eugene S. McCartney and William C. Steere, eds.—*Univ. of Mich. Press,* 643 p., $5.

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ENGINEERING

MECHANICS OF LIQUIDS, An Elementary Text in Hydraulics and Fluid Mechanics—Ralph W. Powell—*Macmillan,* 271 p., $3.50. Hydraulics as taught to engineers at the Ohio State University.

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ENGINEERING

HOW TO DESIGN AND INSTALL PLUMBING — A. J. Matthias, Jr. — *American Technical Soc.,* 388 p., $3. Even a master plumber will be able to pick up some new tricks of his trade in this comprehensive book.

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PHYSICS

A TEXTBOOK ON LIGHT—A. W. Barton —*Longmans, Green,* 426 p., $3. Here is one of those very excellent textbooks from England which are used to prepare for examinations for university scholarships. The treatment is rigorous and thorough and above the usual American standards in such presentations. It is intended for the really serious student of physics in the junior and senior years of college.

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PSYCHOLOGY

PSYCHOLOGY (4th. ed.) — Robert S. Woodworth—*Holt,* 639 p., $2.75.

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ECONOMICS

PRODUCTION MANAGEMENT — A. M. Simons—*American Technical Soc.,* 597 p., $3.50. A textbook for the student of industrial management. The author's assertions about the "crowd mind" will probably meet with disagreement among psychologists.

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PHOTOGRAPHY

THE BOYS' BOOK OF PHOTOGRAPHY—Edwin Way Teale—*Dutton,* 252 p., $2. Beautifully illustrated by the author, this book will be enjoyed by parents as well as by their sons.

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CHEMISTRY

EXPERIMENTS AND PROBLEMS FOR COLLEGE CHEMISTRY (3rd. ed.)— J. E. Belcher and J. C. Colbert—*Appleton-Century,* 207 p., $1.75. Laboratory chemistry as taught at the University of Oklahoma.

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PHYSICS

HOUSEHOLD PHYSICS LABORATORY MANUAL—Madalyn Avery—*Macmillan,* 92 p., $1.50. Here is the laboratory manual to the textbook "Household Physics". It is designed principally for students in home economics and in the general arts course.

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PSYCHOLOGY

FACTS AND THEORIES OF PSYCHOANALYSIS (2d. ed.)—Ives Hendrick—*Knopf,* 384 p., $3. A revised and enlarged edition including a new chapter on the use of psychoanalysis in connection with treatment of organic disease.

Science News Letter, June 8, 1940

GENERAL SCIENCE

THE ROAD TO MODERN SCIENCE—H. A. Reason—*Appleton-Century,* 297 p., $3. A simply written history of science from earliest times to the present, written by a British secondary-school teacher of science.

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TELEVISION

TELEVISION FOR BEGINNERS, Theater Television—James R. Cameron—*Cameron,* 94 p., $2. Fundamentals of television, of particular interest to the projectionist in motion picture theaters which soon may be showing television.

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ENGINEERING

STAIR BUILDING—Gilbert Townsend—*American Technical Soc.,* 200 p., $2. Here is described the fine art of building stairs, which is almost as old as the art of building itself.

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ENGINEERING

MACHINE SHOP TRAINING COURSE—Franklin D. Jones—*Industrial Press,* Vol. I, 474 p., $4; Vol. II, 552 p., $4; Vol. I and II together, $6. In a world in which machines are increasingly important, and machinists in demand, this set should meet a real need as text for apprentice course or for home study.

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GENERAL SCIENCE

THE NEW INTERNATIONAL YEAR BOOK, 1939—Charles Earle Funk, ed.—*Funk & Wagnalls,* 822 p., $6.25. The annual record and survey of what the world's been doing, done with great thoroughness and competence. The war adds its flavor to many of the contributions, but science and engineering topics are given extensive treatment as in past years.

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GENERAL SCIENCE

THE NATIONAL PHYSICAL LABORATORY, Report for the Year, 1939—Great Britain. Dept. of Scientific and Industrial Research—*British Library of Information,* 100 p., 75c.

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CRIMINOLOGY

CRIMINAL BEHAVIOR—Walter C. Reckless—*McGraw-Hill,* 532 p., $3.75. Practically an encyclopedia of the factors which influence the kind of behavior which we call criminal.

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GENERAL SCIENCE

THE ROAD WE HAVE COVERED—John Andersen Udmark—*Modern Age Books,* 361 p., $3.50. A readable and not too lengthy review of man's place in the universe, the world, history, science and the social order.

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First Glances at New Books

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BOTANY

THE BADIANUS MANUSCRIPT (CODEX BARBERINI, LATIN 241), Vatican Library, An Aztec Herbal of 1552—Emily Walcott Emmart, ed. and trans.—*Johns Hopkins Press,* 341 p., 118 colored facsimile plates, $7.50. Written and illustrated by two Hispanized Aztecs only a generation after the Conquest, this book is now published for the first time. It is an herbal, and constitutes at once the first botanical book and the first medical book written in America. Originally composed in Aztec by Martinus de la Cruz, and illustrated in color by him, it was translated into Latin by Juannes Badianus. The Latin text is given in parallel columns with the new English translation; there are copious notes; the original manuscript is reproduced in color, page for page. In general, the editorial treatment is worthy of the importance of the subject. (See also *SNL,* Oct. 19, 1935.)

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PSYCHIATRY

PSYCHIATRIC CLINICS FOR CHILDREN—Helen Leland Witmer—*The Commonwealth Fund,* 437 p., $2.50. Here are the results of a survey conducted by the field staff of the National Committee for Mental Hygiene of psychiatric services available to children in the United States. A brief summary of psychiatric theory and social attitudes serves as introduction for the consideration of practical problems and principles for future programs.

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EXPLORATION

MODERN ARCTIC EXPLORATION—Gunnar Seidenfaden—*Hale, Cushman & Flint,* 189 p., illus., $2.50. Although not large, this introduction to polar research is compact and informative, describing such matters as biologic and marine research, and summing up exploration history, with good maps and illustrations.

Science News Letter, June 8, 1940

ANTHROPOLOGY

AS LONG AS THE GRASS SHALL GROW—Oliver La Farge—*Alliance Book Corporation,* 140 p., photographs by Helen Post, $2.50. Words and photographs, both expertly handled, combine in this book to tell the moving epic of the American Indian. Miss Post's pictures show no stolid, poker-faced Indians, but people with emotions, and actively at work and play. The title? It quotes the impressive first phrase of treaties between Indian and white man.

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TRAVEL

THE VACATION GUIDE—Robert Spiers Benjamin — *Whittlesey House,* 329 p., $2.50. In time for summer planning comes this analytic discussion of dude ranches, national parks and, in fact, all sorts of vacation possibilities, including vacations featuring eating, sports, and culture.

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AERONAUTICS

GENERAL AERONAUTICS (Rev. ed.) — Hilton F. Lusk—*Ronald Press,* 524 p., $3.75. The first edition of this work appeared in 1932, but so great have been the advances made in aviation since then that it has been necessary to make this second edition practically a new book. Covering such diverse phases as air navigation, meteorology, principles and construction of aircraft engines, principles of flight, etc., it should prove a valuable summary of aeronautical knowledge in 1940.

Science News Letter, June 8, 1940

MATHEMATICS

ODD NUMBERS, OR ARITHMETIC REVISITED — Herbert McKay — *Cambridge (Macmillan),* 215 p., $2.50. An instructive yet entertaining account of some of the interesting things that can be done with numbers.

Science News Letter, June 8, 1940

METEOROLOGY

THE AIR AND ITS MYSTERIES—C. M. Botley; American edition arranged by Hanor A. Webb — *Appleton-Century,* 302 p., $3. The elements of meteorology, well told by an English leader in the science and well adapted to American conditions.

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PHYSICS

PHYSICS AND REALITY — Kurt Riezler —*Yale Univ. Press,* 124 p., $2. The shadow of old Aristotle lectures at Cambridge and attacks the stumbling blocks of modern science. Using the modern English idiom Aristotle uses his profound reasoning to clear up some of his mistakes of previous times in light of their relation to the present knowledge of physics. A fascinating book on the logic of physics for those with adequate scientific training.

Science News Letter, June 8, 1940

PSYCHOLOGY

SOCIAL PSYCHOLOGY—Otto Klineberg—*Holt,* 570 p., $3. In the present state of the world, this new up-to-date text from Columbia University should find an interested audience much wider than that of the classroom.

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AERONAUTICS

AVIATION FROM THE GROUND UP—G. B. Manly—*Drake,* 369 p., $3. Here is a textbook which gives practical instructions and serves as a reference work on aviation and its allied subjects. The author is a Lieutenant in the U. S. Army Air Corps Reserve. The book is an excellent text for the basic ground course in aviation.

Science News Letter, June 8, 1940

AERONAUTICS

SKY ROADS—Ernest K. Gann — *Crowell,* 121 p., $2. What it takes to fly a commercial airplane and the training one needs to do it, as described by a transport pilot.

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STATISTICS

APPLIED GENERAL STATISTICS—Frederick E. Croxton and Dudley J. Cowden —*Prentice-Hall,* 957 p., $4. "This book is intended for the use of readers who are interested in the understanding of statistical methods, and in their application in various fields, especially the social sciences."

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PSYCHOLOGY

THE CENSOR MARCHES ON—Morris L. Ernst and Alexander Lindey—*Doubleday, Doran,* 346 p., $2.50. Books, movies and radio have their enforced inhibitions as the result of the administration of the obscenity law in the United States. Here is the record of sex censorship yesterday and today and what it may be tomorrow.

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ENGINEERING

NEON TUBE PRACTICE (2d. rev. ed.)—W. L. Schallreuter—*Chemical Pub. Co.,* 255 p., $4.25. Revised edition of a much used handbook on Neon tube practise in signs. The examples are chosen from British installations. All too little is given from the American viewpoint despite the fact that this country probably leads the world in the use of Neon signs for advertising purposes.

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